

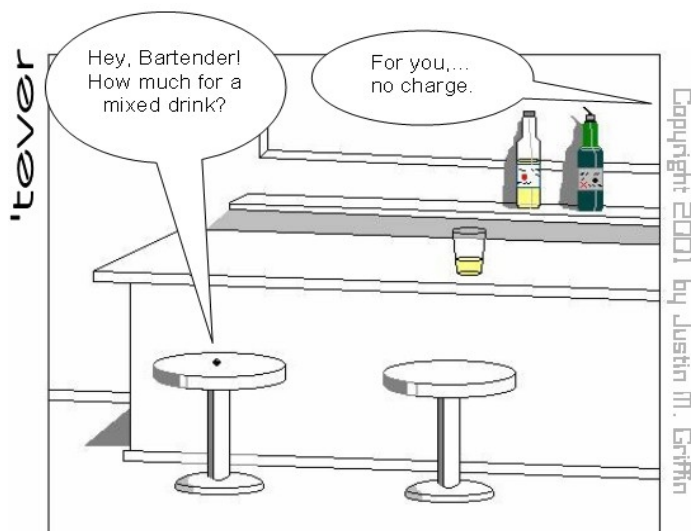
The Dirt on Dirty Bombs

In this extensive article, we will find out what dirty bombs are and what they do. We'll also explore what might happen if one actually went off in a public area and consider some of the consequences of this sort of attack. Sources for this article include statements and publications from the U.S. Nuclear Regulatory Commission (NRC), the federal Council on Foreign Affairs (CFA) and the United Nations.

What is a dirty bomb?

A dirty bomb, or radiological dispersal device (RDD), is a conventional explosive packaged with radioactive material that scatters when the bomb goes off. Basically, the explosives are used to spread radioactive contamination.

An RDD is not a nuclear bomb and does not involve a nuclear explosion or nuclear chain reaction. Any type of radioactive material could be used in an RDD. It is possible, but unlikely, that these devices would cause immediate serious health effects beyond those caused by the detonation of the dynamite, TNT or other conventional explosive material.



A neutron walks into a bar...

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How much expertise does it take to make a dirty bomb?

Not much more than it takes to make a conventional bomb. No special assembly is required; the explosive material would simply disperse the radioactive material packed into the bomb. The hard part is acquiring the radioactive material, not building the bomb.

The relative ease of constructing these devices makes them a particularly worrisome threat. Even so, expertise matters. Not all dirty bombs are equally dangerous: the cruder the weapon, the less damage inflicted. We don't know if terrorists could properly handle and detonate high-level radioactive material without fatally injuring themselves in the process.

Is a dirty bomb considered a weapon of mass destruction?

Yes, but this is due only to its ability to cause terror and disrupt our way of life rather than its capacity to inflict heavy casualties. Depending upon the sophistication of the RDD, the weather conditions and the efficiency of evacuation, the number of deaths and injuries from an RDD might not be substantially greater than from a conventional bomb explosion. But panic about radioactivity and evacuation measures could cause a major disruption. Moreover, the affected area would be off-limits for possibly several months during clean-up efforts, which could paralyze the local economy and also cause public fears about living in a formerly contaminated area.

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The Dirt on Dirty Bombs (cont.)

Has a dirty bomb ever been used?

No. However, in May 2002, the United States arrested an alleged al-Qaeda terrorist for plotting to build and use an RDD. Also, according to a United Nations report, Iraq tested a one-ton RDD in 1987 but gave up on the idea because the radiation levels it generated were not deadly enough.

What radioactive materials could be used to construct a dirty bomb?

Many types of radioactive materials with military, industrial or medical applications could be used in an RDD. Weapons-grade plutonium or uranium, as well as spent nuclear fuel, would be the most deadly but is also the hardest to obtain and handle safely.

Medical or industrial supplies of radioactive material such as cesium, iodine or americium could be used instead. These types of sources are less dangerous than high-activity sources in general, but easier to obtain and prepare.

What would be the impact of a dirty bomb attack?

In most cases, any immediate deaths or serious injuries would result from the explosion itself, rather than from radiation exposure. According to the NRC, it is possible, but unlikely, that the radioactive material in an RDD would cause casualties. The radioactive material would be dispersed into the air and reduced to relatively low concentrations, resulting in low doses to people exposed. In addition, most people would be expected to run away from the explosion automatically and take shelter, further reducing exposure.

However, an RDD potentially could have a significant psychological impact by causing fear, panic and disruption. Use of an RDD could result in radioactive

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SAY WHAT?

"Working safely with radiation just takes good old common sense. After all, it's not rocket science; hey, it's no more mysterious than nuclear physics."

John Hageman, RSO for Southwest Research Institute

Did You Know?

For each can of beer consumed, one may receive about 0.35 mR of internal radiation exposure.

Shipping Papers: Emergency Response Phone Numbers

The U.S. Department of Transportation Hazardous Material Transportation Regulations in 49 CFR require shippers to provide a 24-hour (continuously manned) emergency telephone number on shipping papers for the interstate or intrastate shipment of hazardous materials (including nonexempt quantities of radioactive material). Failure to have a valid emergency telephone number during the transport of hazardous material may result in a substantial enforcement penalty. Shipper registration with a service called CHEMTREC® is sometimes used to help meet this regulatory requirement.

Unfortunately, many shippers use CHEMTREC's 24-hour emergency telephone number without being properly registered. Some shippers believe that since CHEMTREC provides emergency response information to emergency responders at no charge as a public service, they can also list the phone number on documents such as shipping papers, bills of lading or MSDS sheets at no charge. CHEMTREC's emergency information hotline is provided free of charge to callers however, the service is **not free** to shippers of hazardous material that use it to comply with 49 CFR 172.604.

Some shippers also mistakenly believe that if their suppliers (manufacturers) or customers are using the CHEMTREC emergency number on MSDS sheets or shipping documents, they may use it too. However, any shipper that uses the CHEMTREC emergency phone number must be a registrant or a listed subsidiary of a registered company. ☢

The Dirt on Dirty Bombs (cont.)

contamination of an area of a city, up to several blocks, with low levels of contamination requiring cleanup. The extent of the contamination depends on a number of factors including the size of the explosive, the amount and type of radioactive material used and weather conditions.

*A dirty bomb would be more of a **disruptive weapon** than a **destructive weapon**.*

The detectability of radiation is a major asset in reducing health and safety impacts and in evaluating the extent of contamination. Cleanup of the contamination could be costly and may take months to complete.

In the aftermath of September 11, U.S. scientists are still conducting detailed evaluations of possible RDD scenarios; they emphasize that such calculations are extremely complicated.

How many people would be killed or injured by a dirty bomb?

People in the immediate vicinity would likely die from the force of the conventional explosion itself. According to the CFA, it is possible, but unlikely, that some survivors of the initial blast may die of radiation poisoning in the weeks following the attack (if radiation exposures are quite high). It is remotely possible that those farther away from the explosion might even exhibit symptoms of radiation sickness in the days and weeks afterward but will recover. Risks of cancer in the affected area may rise, but long-term effects are difficult to quantify.

Would the affected area ever be usable again?

Probably. A relatively simple RDD detonated in a large building might only require a few months of decontamination and clean-up efforts. But it may be difficult to assess exactly where and when the radioactivity has returned to "safe levels." Despite the intensity and success of the cleanup, public fear about the previous contamination may still linger.

There is no precedent for a RDD attack, but we can learn from other incidents of contamination. Nagasaki and Hiroshima were both exposed to large amounts of contamination (from actual nuclear blasts) and today they are considered safe for

habitation. On the other hand, there are still areas around Chernobyl that remain uninhabitable.

Does the U.S. government have a plan to respond to a dirty bomb?

The Federal Emergency Response Plan, drawn up in 1996 and rehearsed regularly, covers many scenarios related to the release of radiation. The Federal Emergency Management Agency would coordinate a response by several civilian and military entities. After dealing with the initial blast casualties, the top priorities would be the treatment of any radiation sickness, the containment and monitoring of radioactive fallout, evacuation and decontamination.

The President's proposed Department of Homeland Security also would have a division to respond to nuclear, radiological, biological and chemical threats.

What should I do if I'm in the vicinity of a dirty bomb explosion?

First of all, there would probably be no immediate way for the public to distinguish a dirty bomb from a regular explosion. The NRC and experts cited by the CFA advise people to stay inside or get inside some sort of sheltered area away from the blast, and then listen to the radio or television for further instructions from emergency officials.

Emergency officials will arrange medical treatment for those injured by the blast and, if necessary, evacuate people from the affected area, perform radiation surveys, decontaminate those who are contaminated, and assess internal and external radiation exposures. ☹️



During the days of the cold war when the superpowers were testing thermonuclear weapons in the open air, there were sometimes unexpected results. In late May 1953, the U.S. government tested an atomic bomb in the atmosphere over Frenchman Flats, Nevada. Two days later, hailstones containing small amounts of radioactivity pelted Washington, D.C. Some of the hailstones were the size of tennis balls.

New Names in Environmental Health

State Health Officer – Dr. Terry Dwelle

Terry Dwelle, M.D., was appointed to the office of state health officer by Governor John Hoeven in October 2001. Previously, Dr. Dwelle served as chief medical officer for the health department.

Dr. Dwelle earned his medical degree from St. Louis University School of Medicine, graduating cum laude. He later received a master's degree in public health and tropical medicine from Tulane University.

A Garrison, N.D., native, Dr. Dwelle has worked with the University of North Dakota School of Medicine, the Centers for Disease Control and Prevention and the Indian Health Service. In addition, he practiced pediatrics in Bismarck, N.D., for many years. Most recently, Dr. Dwelle headed development of the Community Health Evangelism Program in East Africa.

Deputy State Health Officer – Ms. Arvy Smith

Arvy Smith, a certified public accountant and a certified manager, was appointed deputy state health officer by Governor John Hoeven in October 2001.

Previously, she was a budget analyst for the Office of Management and Budget, where her portfolio included the Department of Health and the Department of Human Services. While with OMB, Arvy coordinated the development of the North Dakota Delivers project, which identifies key priorities for state government and provides a system to measure progress towards statewide goals.

A native of Bismarck and New England, N.D., Arvy earned her accounting degree from Moorhead State University in 1981.

Environmental Health Section Chief – Mr. David Glatt

L. David Glatt joined the North Dakota Department of Health in 1983 as an environmental

engineer. In 1989, he managed the Ground Water Protection Program and became assistant director for the Division of Water Quality shortly thereafter.

In May 2000, he was named director of the Division of Waste Management. With the retirement of Fritz Schwindt, David was then promoted to chief of the Environmental Health Section effective May 1, 2002.

David earned a bachelor's degree in biology and a master's degree in environmental engineering from North Dakota State University. He is a member of the North Dakota Board of Water Well Contractors and the National Ground Water Association. Born in Valley City, N.D., David was raised in Milpitas, Calif.

Air Quality Division Director – Mr. Terry O'Clair

Terry O'Clair, P.E., replaced Jeffrey Burgess as Director of the Division of Air Quality in August 2001.

Terry joined the North Dakota Department of Health in 1976 as an environmental engineer. He is a registered professional engineer with a bachelor's degree in civil engineering from North Dakota State University.

Terry has served as president of the Western States Air Resources Council and currently serves on the executive board of the State and Territorial Air Pollution Program Administration.

Terry is a native of rural North Dakota and grew up on a farm northwest of Minot near the shores of Lake Darling. ☸

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